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Population Age Group Forecast

MetroPlan 2000
A REGIONAL PLAN FOR THE BOSTON METROPOLITAN AREA

MAPC
Metropolitan Area Planning Council
60 Temple Place
Boston , MA 02111

893/408

ABOUT THIS REPORT

The Metropolitan Area Planning Council is the officially designated regional planning agency for 101 cities and towns in Boston metropolitan region. The Council helps its member communities plan in the areas of economic development, housing, demographics, transportation, water, solid waste and open space.

The development of population forecasts by age group for the MAPC region were funded with contracts from the Massachusetts Department of Public Works and the federal Urban Mass Transportation Administration. The responsibility for the information and opinions contained in this report rests solely with the Metropolitan Area Planning Council.

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Metropolitan Area Planning Council

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Scale in Miles

I. EXECUTIVE SUMMARY

Behind the overall population tranquility of recent years have been unusually dramatic growth and decline in the population of individual age groups or cohorts. This report provides population forecasts by age group in the MAPC region for the years 1990, 2000, and 2010. A modified Cohort- Migration-Survival method was used for making these forecasts. This demographic technique was altered to account for a special treatment of net migration (out-migration - in-migration).

The results of this study show:

- a moderate increase in the total population of the region, i.e. 32,000 during 1980-1990, 21,000 during 1990-2000 and 15,000 during 2000-2010 representing about a one percent increase in each decade.
- a declining trend in natural increase (births - deaths) after 1990 due to decline in both birth and death rates.
- substantial reduction in net out-migration (population out-flow - population in-flow) from 208,000 during the 1970s to 88,000 during the 1980s, 65,000 during the 1990s, and 45,000 during the 2000s.
- significant population declines for those between the ages of 15 to 24 during the 1980s, those 25 to 34 during the 1990s and those 35 to 44 during the 2000s.
- significant population increases for those between the ages of 35 to 44 during the 1980s, 45 to 54 during the 1990s and 55 to 64 during the 2000s.

Some implications of our age group forecasts are:

- the proportion of persons 65 and over will go up dramatically only after 2010.
- the school-age population will decline during the 1980s, increase during the 1990s and moderately decline thereafter.
- population in the prime working ages between 15 to 64 will increase until 1990 and then start to decline.

II. INTRODUCTION

In the United States, between 1970 and 1980 about 90% of the population increase occurred in the West and South census regions. A number of North and Northeast states lost population, although Massachusetts experienced a small growth. The MAPC region lost about 4% of its 1970 population, attributed to a low rate of natural increase (births - deaths) and a high rate of net out-migration (population outflow - population inflow). This regional pattern has persisted for many decades.

Behind this relative population tranquility have been unusually dramatic growth and decline of individual age groups or cohorts. The purpose of this study is to develop regional, age group population forecasts for 1990, 2000, and 2010. The results are a synthesis of two different approaches to population forecasting - a micro approach, based on individual forecasts for the cities and towns in the region and a macro approach based on regional data. The study takes into account earlier MAPC population forecasts which are based on available undeveloped land and residential growth potential in each of the region's 101 communities.

Several demographic methods with alternative sets of assumptions were used to forecast population by age groups. This multi-model approach was designed to test how much our forecast results were dependent on the method used. A modified Cohort-Migration-Survival method* was considered appropriate for regional forecasting.

The totals arrived at by adding the age group projection figures were compared with the earlier MAPC total population forecasts. Minor reconciliations were made between the earlier and present forecasts to ensure consistency.

II. DATA AND METHODS

A. Data Sources

The age group population forecasts for the MAPC region use the following data: (1) Bureau of the Census historical population data for cities and towns and the Boston Standard Metropolitan Statistical Area (SMSA). (2) Birth and death (total and age-specific) data for cities and towns published by the Massachusetts Department of Public Health and for the Boston-Lawrence-Salem-Lowell-Brockton NECMA**, published by the U.S. Department of Health.

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* See Appendix A for details. The standard demographic Cohort-Migration-Survival method was modified to account for a special treatment of net migration (out-migration - in-migration). Historical net migration patterns in the region do not show a consistent trend and differ from those in most urban areas in the nation. A method without appropriate modifications would not capture this important region-specific aspect.

** The NECMAS or New England County Metropolitan Areas are county versions of New England metropolitan areas.

B. Forecast Method

The method adopted is a variation of the method used by the Bureau of the Census* to make national population projections and is similar to the one used by the Massachusetts Institute of Social and Economic Research (MISER)+ in its forecast of natural increase in population. MAPC's method differs from MISER's in its treatment of net migration. First, natural increase and net migration are handled separately rather than jointly due to the need for a special region-specific treatment of net migration. Second, the projection of net migration is not directly linked to regional employment growth.

MAPC chose not to use an econometric model such as the one used by Data Resources, Inc., Lexington (DRI)**. Such models can not have high predictive power at the micro or regional level where adequate data do not exist and available data are subject to high sampling error. Regional econometric models are also typically more successful in short rather than long-range forecasting.

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* For the Census Bureau method, see Appendix B.

+ For the MISER method, see Appendix C.

** For the DRI method see Appendix E.

C. What Causes Net Migration?

Why people make a long distance move is poorly understood; the motivation and frequency to migrate varies from place to place and year to year. Relocation may be related to factors at the area of origin or destination. People move to live in a warmer climate, attend school, escape from poor employment or income prospects, reestablish ties to children, relatives and friends, enhance income or career prospects, gain cultural or environmental amenities or to reduce living expenses.

Existing studies on internal migration in the United States uniformly hold that while high unemployment induces substantial out-migration, boom conditions do not necessarily induce substantial in-migration. MISER forecasts essentially take exception to this research postulating that if employers expand their work force in this region, then its residents or migrants from outside of the region will automatically appear to take those new jobs.

However, many studies find simultaneous interaction between employment and net migration, each affected by the other and not MISER's one-way relationship. Some studies (See references - Muth, 1971 and Greenwood and Hunt, 1984) suggest that the net movement of population into a region can "cause" employment growth as the migrant is absorbed into the labor force. Such a relationship seems especially possible under the low unemployment labor market condition which presently characterizes the MAPC region. This is contrary to the view that a rapid increase in the local demand for labor "causes" an increase in the flow of labor into the area.

D. Treatment of Net Migration

Because of the controversies surrounding the cause of migration*, a complicated method to project net migration is unnecessary. MAPC uses a synthesis of migration trends for the region between 1940 and 1986** and an expectation that the future rate of net out-migration will diminish.

MAPC estimates show that the decennial rate of net migration has typically been negative, but at a considerably lower rate than during the 1970s. The persistence of net out-migration over many years reflects the rapidly growing economies in the West and South relative to the North and East, and to a lesser extent, a steady stream of retirees to the sunbelt.

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* A recent study of migration in the Boston metropolitan region by the Economics Department of Boston University found migration to be related to the crime rate, race, overcrowding, income, rents, and housing prices, apart from wage and employment growth. Even during the years of substantial net out-migration, there was considerable net in-migration of college-aged persons. Over the years most net out-migration from the region has occurred in the post-college, early retirement and post-retirement age population groups.

** Population forecasts for the Boston region often heavily rely on the 1970-1980 pattern of demographic change indicated by census data as a basis for future projections. The heavy net out-migration of that decade is a poor basis for extrapolation; the standard demographic method was appropriately modified before making MAPC's forecasts.

The heavy net out-migration of 208,242 persons during 1970-1980 was exceptional and not indicative of any trend.* The period 1970-1977 was one of unusually high unemployment in the region, with the unemployment rate reaching 10.5% in 1975. MAPC's other decennial estimates are: 1940-1950: +24,180; 1950-1960: -81,281; 1960-1970: -18,611; and 1980-1986: -63,299.

A relatively low rate of in-migration and high rate of out-migration from the MAPC region is expected to continue for some time despite a prosperous economy. The region's very high cost of housing is frequently noted as the major obstacle to any improvement. By one Boston Redevelopment Authority estimate the median value of a home is 7.7 times the level of income as of 1988, the highest ratio of any metropolitan area in the country. Median rents by any recent measure are equally expensive.

Nevertheless, MAPC forecasts a gradual reduction in the rate of net out-migration due to a smaller number of young adults and those nearing retirement in the region's population between now and 2010 than in the two previous decades. Young adults especially move far more than average and often have another state as their destination.

A less important reason for expecting a reduction in population outflow is that future economic conditions will be conducive to somewhat higher rates of in-migration and lower out-migration. Continuing employment growth, an economy offering a diversity of jobs, and above average wage growth due to a labor scarcity will increase the incentive

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* See Appendix A for the method used for estimating net migration in the region during 1940-50, 1950-60, 1960-70, 1970-80, and 1980-86.

of young adults to stay; expansion by several universities will increase in-migration of college-age adults.

Also, both an increase in the supply and a reduction in demand for housing could reduce the rate of out-migration. Record high housing prices are encouraging a large supply of homes to come onto the market, moderating the recent rate of price appreciation. In addition, over the next two decades a much smaller generation of young adults will gradually reduce the demand for new homes. One recent Harvard study projected that home prices would fall significantly in the coming decades because of a much smaller number of potential home buyers.+

E. Estimates and Forecasts of Natural Increase

Estimates of natural increase in the population of the region*, based on the modified Cohort-Migration-Survival method are:

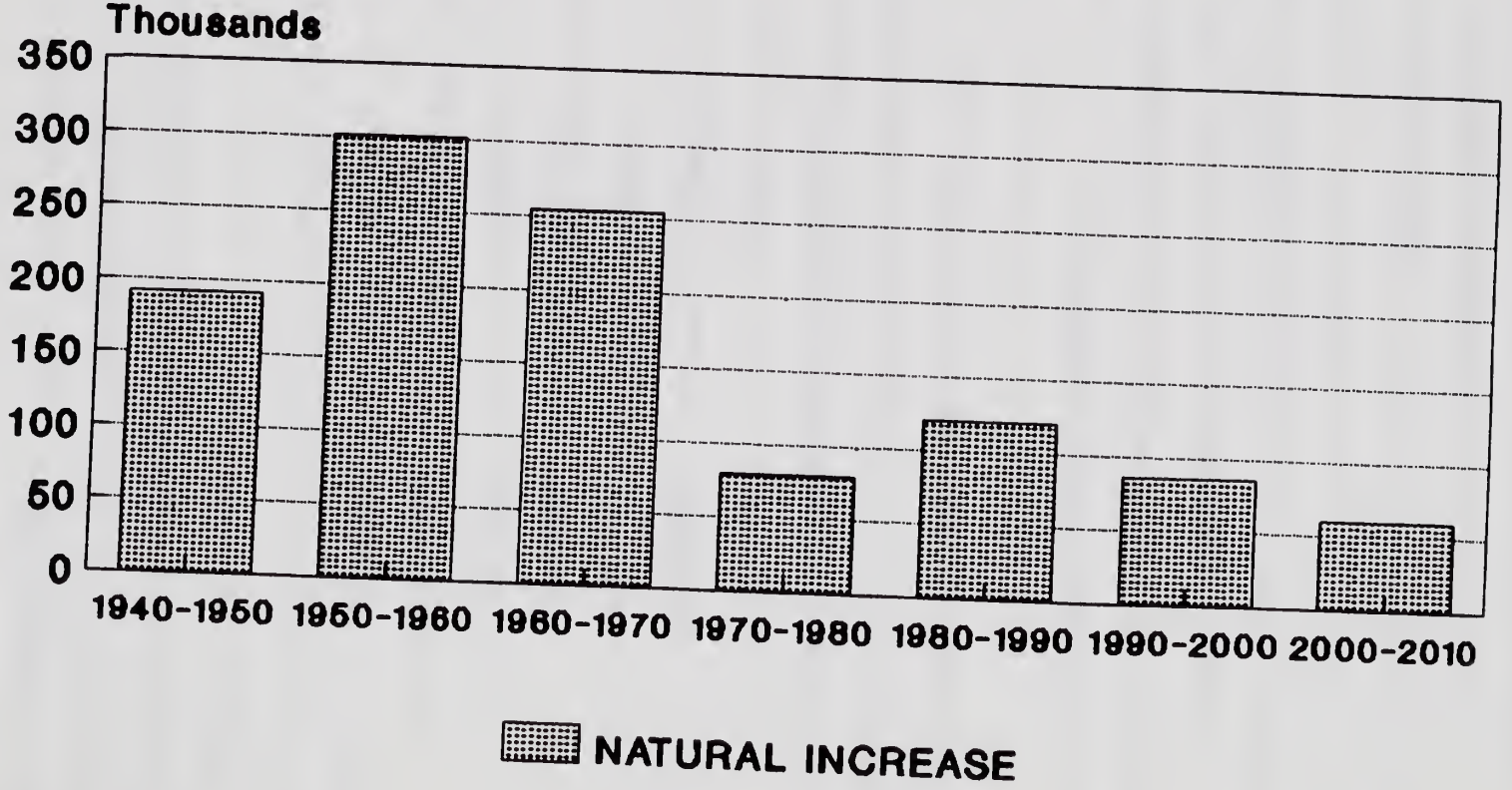
	1940-1950	191,642
	1950-1960	300,996
	1960-1970	245,542
	1970-1980	79,329
	1980-1990	120,288
	1990-2000	85,880
(See graph 1)	2000-2010	60,352

---

* See Appendix A for details.

\+ See N. Gregory Mankiw and David N. Weil. "The Baby Boom, the Baby Bust, and the Housing Market." Unpublished Manuscript, Harvard University, November 1988.

MAPC REGION
NATURAL INCREASE IN POPULATION
(1940-2010)



SOURCES: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

F. Estimates and Forecasts of Net Migration

Estimates of net migration by age group during 1970-1980, calculated by the Cohort-Migration-Survival method, are as follows:

AGE GROUP	NET MIGRATION (1970-1980) MAPC REGION
Under 5	-6,819
5-14	-27,275
15-24	16,475
25-34	-43,662
35-44	-36,075
45-54	-23,124
55-64	-36,792
65-74	-39,174
75 and Over	-11,796
TOTAL	-208,242

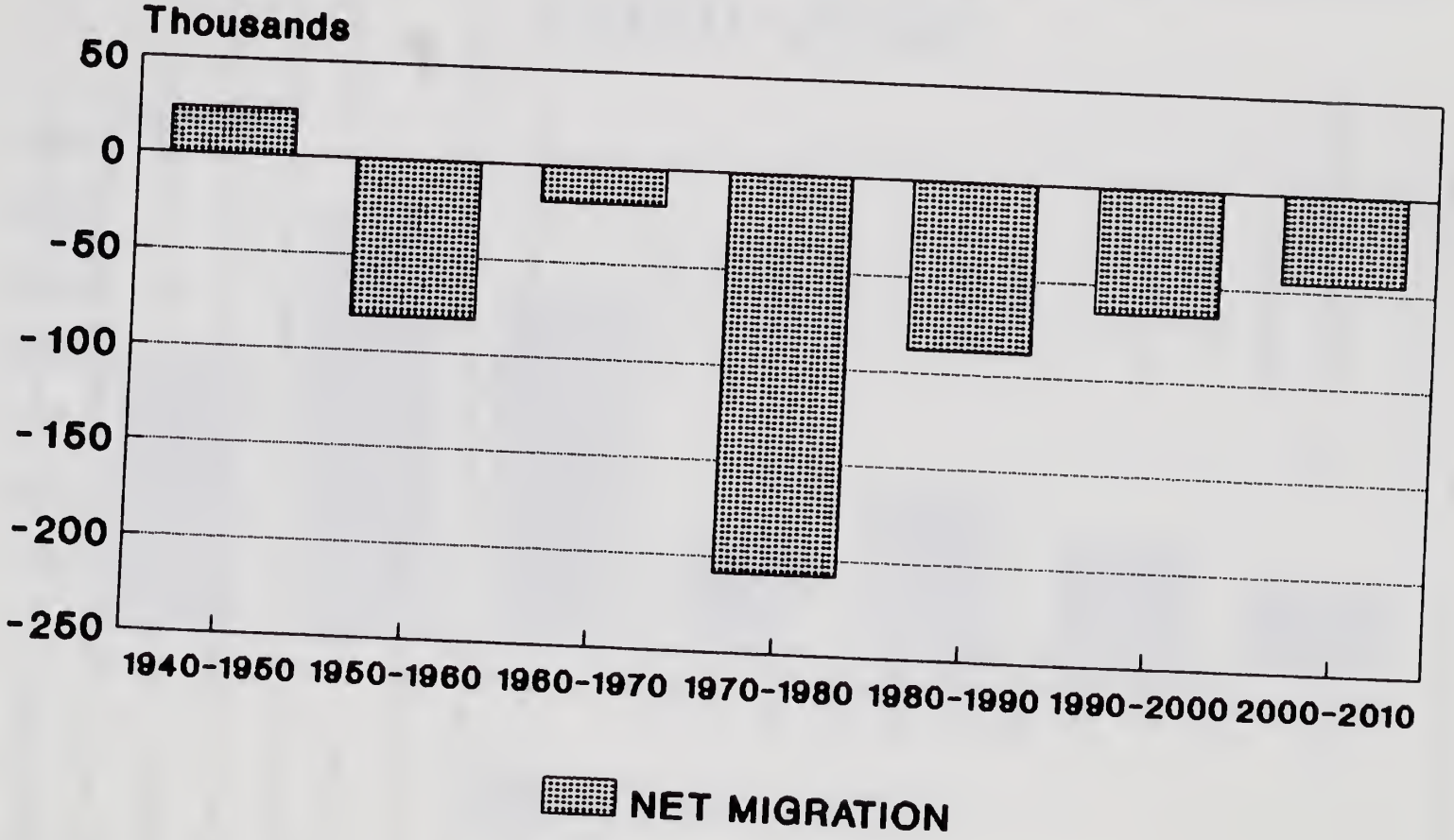
(See graph 2)

The decade of the 1970s shows moderate in-migration for those of college age and considerable out-migration of young adults and those nearing or just beyond the typical age of retirement.

MAPC projects a regional net out-migration for the 1980s of 88,000. This is based on an estimation for 1980-1986 from Census Bureau population estimates and by prorating this rate of net out-migration through 1990. Moderate decline in the region's decennial net out-migration is projected after 1990 and through 2010 for the reasons given earlier.

The MAPC forecasts of net migration in the region are as follows:

MAPC REGION
NET MIGRATION (1940-2010)



SOURCES: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

1980-1990	-88,000
1990-2000	-65,000
2000-2010	-45,500

These projections are based on the age group distribution of net migration between 1970 and 1980 with a minor modification for the net in-migration in the age group 15 to 24. A constant percentage distribution of net out-migration by age group is assumed over the forecast period.

IV. MAPC POPULATION AGE GROUP FORECASTS

The results of the MAPC forecasting method are depicted in the following tables:

PERCENTAGE OF TOTAL POPULATION

MAPC REGION

AGE GROUP	1980	1990	2000	2010
0-4	5.3	6.0	6.3	6.0
5-14	13.6	12.0	13.0	13.2
15-24	20.0	14.2	12.1	13.0
25-34	17.0	19.0	13.5	11.9
35-44	11.1	15.9	17.7	12.8
45-54	10.5	10.5	15.0	16.7
55-64	10.0	9.2	9.2	13.3
65-74	7.2	7.6	7.1	7.1
75+	5.3	5.6	6.1	6.0

DECADE-TO-DECADE CHANGE IN POPULATION

AGE GROUP	1980-1990	1990-2000	2000-2010
0-4	23,393	9,524	-8,037
5-14	-44,761	32,758	7,183
15-24	-162,203	-59,465	29,781
25-34	63,580	-158,647	-44,430
35-44	144,994	56,062	-142,263
45-54	1,838	134,834	53,122
55-64	-20,736	2,656	121,043
65-74	16,203	-13,096	1,105
75+	9,980	16,154	-1,858
TOTAL	32,288	20,880	15,352

POPULATION BY AGE GROUPS

AGE GROUP	1980	1990	2000	2010
0-4	151,335	174,728	184,352	176,021
5-14	393,780	349,019	381,778	388,960
15-24	576,417	414,214	354,749	384,530
25-34	490,358	553,938	395,292	350,862
35-44	319,830	464,824	520,886	378,623
45-54	303,864	305,702	440,535	493,657
55-64	289,246	268,510	271,166	392,209
65-74	206,364	222,567	209,471	210,576
75+	153,518	163,498	179,651	177,793
TOTAL	2,884,712	2,917,000	2,937,880	2,953,232

IV. COMPARISON WITH OTHER FORECASTS

A. Federal and State Agency Forecasts

Age group forecasts by the Massachusetts Instsitute for Social and Economic Research (MISER) for Massachusetts and Suffolk, Norfolk, Essex and Middlesex counties (combined)* and forecasts by the Bureau of the Census for Massachusetts are presented below:

MASSACHUSETTS AND FOUR-COUNTY POPULATION FORECASTS
BY THE MASSACHUSETTS INSTITUTE FOR SOCIAL & ECONOMIC RESEARCH
PERCENTAGE OF TOTAL POPULATION

	MASSACHUSETTS		SUFFOLK-NORFOLK-ESSEX-MIDDLESSEX COUNTIES	
AGE GROUP	1990	1995	1990	1995
0-4	6.7	6.5	6.3	6.1
5-14	13.4	14.0	12.5	13.3
15-24	14.1	11.9	14.1	11.4
25-34	18.4	16.4	19.4	17.3
35-44	14.8	16.8	15.1	17.3
45-54	9.9	12.1	10.1	12.3
55-64	8.8	8.1	9.0	8.3
65-74	8.0	7.8	7.7	7.7
75+	6.0	6.4	6.0	6.3

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* Most of the towns and cities in the MAPC region belong to one of the four counties.

B. Comparison with MAPC Forecasts

MAPC's age group population forecasts are similar to those for the state by the Bureau of the Census. One difference is that MAPC forecasts the current trend of increased births to continue beyond 1990 and through 2000. Births will remain at a high level through 2000 because of the strong tendency among the region's women to bear children at very late ages. MISER's forecasts imply a similar viewpoint.

MASSACHUSETTS POPULATION FORECASTS
BY THE BUREAU OF THE CENSUS
PERCENTAGE OF TOTAL POPULATION

AGE GROUP	1990	2000
0-4	6.5	5.7
5-17	15.8	16.8
18-24	10.7	8.8
25-44	33.7	32.0
45-64	19.1	22.7
65+	14.2	14.1

MAPC's forecast differs from MISER's in three main areas: First, MAPC's forecast implies the future continuation of net in-migration of college age adults while MISER's does not. Why MISER expects a reversal in the historical in-migration of 15 to 24 years olds is unclear. Second, MISER's forecast implies considerable net in-migration in the 25 to 34 age-group while MAPC's forecast does not.

This difference is due to the one-way migration-employment causality postulated by MISER. Third, MAPC forecasts a small increase in the number of the elderly by 1995 while MISER projects a high increase. MAPC believes the number of elderly will rise, but that a major increase will occur only after 2010.

V. AGE GROUP FORECAST IMPLICATIONS

Our MAPC region age group population forecasts have the following implications:

1. Most of the significant population changes between 1980 and 2010 will accrue to those between 15 and 64 years old. Population declines are projected for age groups 15 to 24 during 1980-1990, 25 to 34 during 1990-2000 and 35 to 44 during 2000-2010. Most population gains will occur in age groups 35 to 44 during 1980-1990, 45 to 54 during 1990-2000 and 55 to 64 during 2000-2010. Many social and economic needs can be directly linked to fluctuation in cohort size. Public and private sector planning should anticipate these changes in their program designs and marketing.

2. The proportion of persons 65 years and over will grow very slowly, contradicting a commonly held expectation. After 1990, only the population 75 years old and over will show a steady increase. The size and proportion of the over 65 generation will increase dramatically only after 2010. MAPC forecasts of the elderly population are:

	POPULATION 65-74 YEARS OLD	POPULATION 75 YEARS AND OVER
1980	206,153	153,518
1990	222,567	163,498
2000	209,471	179,651
2010	210,576	177,793

The cohorts turning 65 between now and 2010 are those born during the Great Depression, when far fewer persons were born than before or after it. The continuance of a steady stream of retirees to the sunbelt is also likely to limit the population increase of the elderly during the next two decades.

3. The number of children 0 to 4 years old will steadily increase because of the greater number of women in prime child-bearing ages who will be bearing children. After 2000, the number of births will stabilize and later decline as the fewer number of women of child bearing age born in the 1970s have correspondingly fewer births. By 2010 births will again be near their historical low level. The school-age population drop during the present decade, increase during the 1990s and stabilize between 2000 and 2010. The MAPC population estimates for age groups 0 to 4 and 5 to 14 are as follows:

	POPULATION 0-4 YEARS OLD	POPULATION 5-14 YEARS OLD
1980	151,335	393,780
1990	174,728	349,019
2000	184,352	381,778
2010	176,021	388,960

4. The population in the prime working age groups, i.e. 15-64, will increase until 1990 and then start to decline moderately. The MAPC population projections for those 15 to 64 are as follows:

POPULATION 15-64 YEARS OLD

1980	1,979,715
1990	2,007,188
2000	1,982,628
2010	1,999,881

Employers within the MAPC region are facing a labor shortage now. Over the next two decades the region's labor force will increase its present size moderately due to the growing labor force participation of women and what may be a declining tendency towards early retirement. Starting about 2010, the region's labor force is likely to begin a sustained and sharp drop in size as members of the large baby boom generation retire. The public and private sector should begin planning for replacement of their labor-intensive activities well in advance of this potentially serious limitation on future economic activity.

7. POPULATION PROJECTION METHODS

A. MAPC

The MAPC population forecasts for the Boston metropolitan region are primarily based on the Cohort-Migration-Survival method* in which survival and migration are treated independently. The following data sources and methods were adopted.

1. Total population in each city and town in the MAPC region in 1940, 1950, 1960, 1970 and 1980 from the federal census and 1982, 1984, and 1986 Census Bureau estimates.**

	Change in MAPC region population
1940-1950	215,822
1950-1960	219,715
1960-1970	235,931
1970-1980	-129,003
1980-1982	- 7,897
1982-1984	12,882
1984-1986	- 6,707

2. Annual births and deaths for each city and town published by the Massachusetts Department of Public Health were used to estimate

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* For a description of the method see under "references" Shryock, Henry S., Jacob S. Siegel and Associates.

** See Appendix 1, 5 & 6.

natural increase (births - deaths)* and net migration (In-migration - Out-migration) for cities and towns for different periods .* The formula used is: Net Migration = Change in Population - Natural Increase.

MAPC REGION

	Natural Increase	Net Migration
1940-1950	191,642	+24,180
1950-1960	300,996	-81,281
1960-1970	254,542	-18,611
1970-1980	79,329	-208,242
1980-1982	18,065	-25,962
1982-1984	19,645	- 6,764
1984-1986	23,866	-30,573

3. Population by age groups in the Boston Standard Metropolitan Statistical Area (SMSA) for 1960, 1970 and 1980 from the federal censuses. The MAPC region and the Boston SMSA are similar in geography, size of population and employment; therefore, the age distributions for the Boston SMSA at the three census years were adopted to the MAPC region.+

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* See Appendix 7 and 8.

+ See Appendix 2.

4. Birth, death (total and age-specific) and natural increase rates for Massachusetts and Health Service Area No. 4 (covering a major part of the MAPC region) published in "Massachusetts Reports of Vital Statistics" by the Massachusetts Department of Public Health. Birth and death rates for Boston-Lawrence-Salem -Lowell-Brockton (NECMA) published in "Vital Statistics of the United States" by the U.S. Department of Health. These data were used to calculate birth and total and age-specific death rates for the MAPC region by use of ratio methods.*

The MAPC population projection method involves the following steps.

1. Calculation of net migration by age groups for 1970-80 by applying age-specific death rates to 1970 population, obtaining estimates of survivors in 1980 and then subtracting such estimates from the corresponding 1980 population. Since application of average age-specific death rates to the extreme age groups, i.e. 0 to 10 and over 80, are likely to cause bias, net migration for the age groups 0-10 and 75+ were assumed as follows based on simulation exercises:

AGE GROUP	
5 to 9	Same net migration as for 10 to 14
0 to 4	50% of the net migration rate for 5 to 9
80+	10% of the net migration rate for 65 to 80

---

* See Appendix 3 & 4.

2. Calculation of net migration rates for 1970-80 for different age groups by dividing net migration estimates by the number of "expected survivors" population.

3. Projecting birth and age-specific death rates for 1980-1990, 1990-2000 and 2000-2010 based on extrapolation of past trends, future improvement in longevity and particularly the effects of the baby boom on the pattern of aging. Since the data available were on crude rates, adjustments were made before projecting future population.

4. Estimation of survivors in 1990, 2000 and 2010 by applying the rates derived in (3) to the population in 1980, 1990 and 2000.

5. Projecting net migration for the region for 1980-1990, 1990-2000 and 2000-2010 based on the migration patterns between 1940 and 1986 and assuming a gradual reduction in the future rate of net out-migration as outlined on page 8 of this report.

6. Estimation of net migration by age groups for 1980-1990, 1990-2000 and 2000-2010, using the statistics derived in (5) and applying the age distribution of net migration for 1970-80 derived in (2). Constancy in age disribution of net out-migration over age groups is assumed for the forecast period. A modification was made to accommodate the view that future in-migration of the college age group will continue.

7. Estimation of additional population from new births applying birth rates and age-specific death rates for age groups 0-4 and 5-10.

8. Projection of population by age groups using estimates of survivors derived in (4), estimates of additional population from births derived in (7) and estimates of net migration derived in (6).

9. Comparison of the projected population by age groups with projections based on a standard cohort-component method and making minor adjustments, where appropriate.

B. BUREAU OF THE CENSUS

The population projections for the United States, published by the Bureau of the Census, U.S. Department of Commerce in Current Population Reports, Series P-25, No. 922 use July 1, 1981 as the base date. The figures are consistent with the 1980 Census counts in level and coverage. The projections are prepared by the use of the Cohort-Component Method in which the components of population change (births, deaths and net immigration) are projected separately for each age cohort (persons born in each year) with alternative assumptions of fertility, mortality and net immigration. The base year population was carried forward, year by year, in terms of single years of age, sex and race by means of projected survival rates and assumed amounts of net immigration. Each year, a new birth cohort of infants derived by applying projected fertility rates to the surviving female population was added to the population and then carried forward, year by year in the same manner as the initial population.

In deriving the national population projections, for each of the components (fertility, mortality and immigration) assumptions were made creating middle, high and low growth scenarios. The middle growth scenario reflects the likely future course of the component and the high and low assumptions define a reasonable range of error around the most probable level.

The various assumptions used for the national projections are summarized in the following table.

	Fertility (lifetime births per 1000 women)*	Mortality (life-expectancy in 2050)	Immigration (annual net immigration)
Current Estimates			
1981	1.82	74.1	520,000
1982	1.83	74.5	450,000
Projections			
Middle	1.90	79.6	450,000
Highest	2.30	83.3	750,000
Lowest	1.60	76.7	250,000

The population forecasts by the Bureau of the Census for the nation and Massachusetts are as follows.

	Population ('000)		
	1980	1990	2000
United States	226,546	250,410	268,266
Massachusetts	5,737	5,880	6,087

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* The middle growth scenario is based on pre-projection levels of fertility, and socioeconomic trends affecting the levels of fertility, such as the increase in educational attainment, the rise in age at first marriage, and the increase in labor force participation of women. The fertility levels in the low and high series were assumed to be attained by the 1985 birth cohort for white and other non-black races and by the year 2050 for blacks.

C. MASSACHUSETTS INSTITUTE FOR SOCIAL AND ECONOMIC RESEARCH

The Massachusetts Institute for Social and Economic Research (MISER) has produced population projections by age, race, and sex for the years 1990 and 1995 for each of the 14 counties and 351 cities and towns in the Commonwealth of Massachusetts. The projections use 1970 and 1980 Census data on population by the Bureau of the Census and birth and death rates* by the Massachusetts Department of Public Health. The projections were based on the following methodology.

1. Fourteen different county models+ were created in order to project the population for each county in Massachusetts individually. Each county model had the three components of population change, i.e. birth, survival and migration specific to the county. Within each model was incorporated a relationship between county and U.S. birth and survival rates. Fourteen migration models were created to forecast net migration for each county, assuming the migration rate to be a function of job growth or decline at the county level. Thus migration was viewed as a partial adjustment in meeting the employment demand.

2. The individual town and city total populations were projected using a share allocation method which distributed the county totals down the town level.

---

* Birth rates for 1970-83 and death rates for 1970-80 were used.

+ The model specifications and functional forms used in county/town projections are not described in the MISER report.

Each town within a county was fitted with its own model, allocating the town's share of the projected county growth or decline in population and allowing individualized projections of each town's aggregate population. The models used historical data to calculate time-series trends which were employed to judge the relative "attractiveness" of different towns and project their shares in county population totals.

3. In the allocation steps, the town population figures were controlled so as to add to the county totals, derived in the county models. As MISER's Report observes " while the use of individual models for the allocation of population to each town captures the historical patterns of great variability in population change, the integrity of relying on more aggregate steps is preserved."

The MISER forecasts of population for Massachusetts and MAPC region counties are as follows.

	Population		
	1980	1990	1995
Massachusetts	5,737,037	5,891,165	5,976,917
Suffolk county	650,142	662,965	665,121
Norfolk county	595,704	603,294	602,620
Essex county	329,844	648,711	645,202
Middlessex county	1,028,356	1,366,196	1,359,971

D. THE BUREAU OF ECONOMIC ANALYSIS

The Bureau of Econmomic Analysis (BEA) of the U.S. Department of Commerce has made projections of population for each metropolitan area as follows.

First, the metropolitan area population/employment ratio in 1983 was multiplied by the projected growth in the parent-State population/ employment ratio to the get the projected metropolitan area population/employment ratio. Then, this result was multiplied by the total employment of the metropolitan area - already projected - to get the projected metropolitan area population.

E. DATA RESOURCES, INC.

The Data Resources Inc., Lexington (DRI) uses a sophisticated econometric model involving several economic variables to project state and regional population. Population is projected based on an econometric equation in which regional (or state) share of U.S. (or regional) population is a function of:

- regional (or state) share of employment (3-year moving average),
- regional (or state) relative wage (3-year moving average),
- measure of attractiveness (share of tourism employment),
- education level (percent college educated),
- rainfall, and
- heating degree -days.

The employment variable is the most important variable in the equation, and the relative wage variable is second in importance. In other words, population in a region or state is primarily dependent on economic opportunity, but other factors are also included. No attempt is made to develop a separate migration model.

The DRI forecast of Massachusetts population in 2000 is 6,524,000 as against the Census Bureau projection of 6,087,000.

(1980 Massachusetts population was 5,737,000).

MAPC considers the DRI forecast to be "high". Such a high forecast may be attributed to over-importance to the employment variable and not separately taking into account the demographic factors of fertility, mortality and migration.

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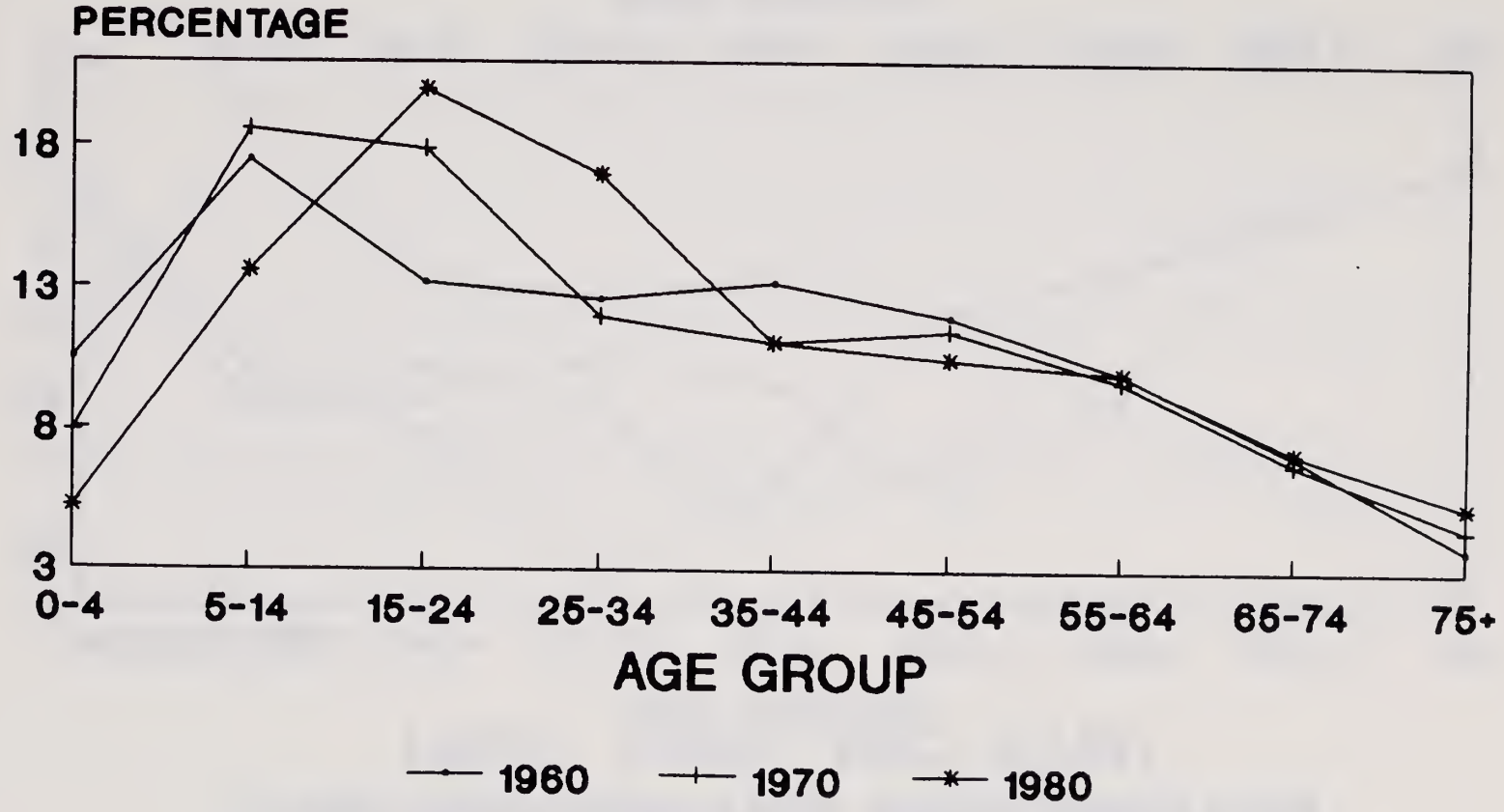
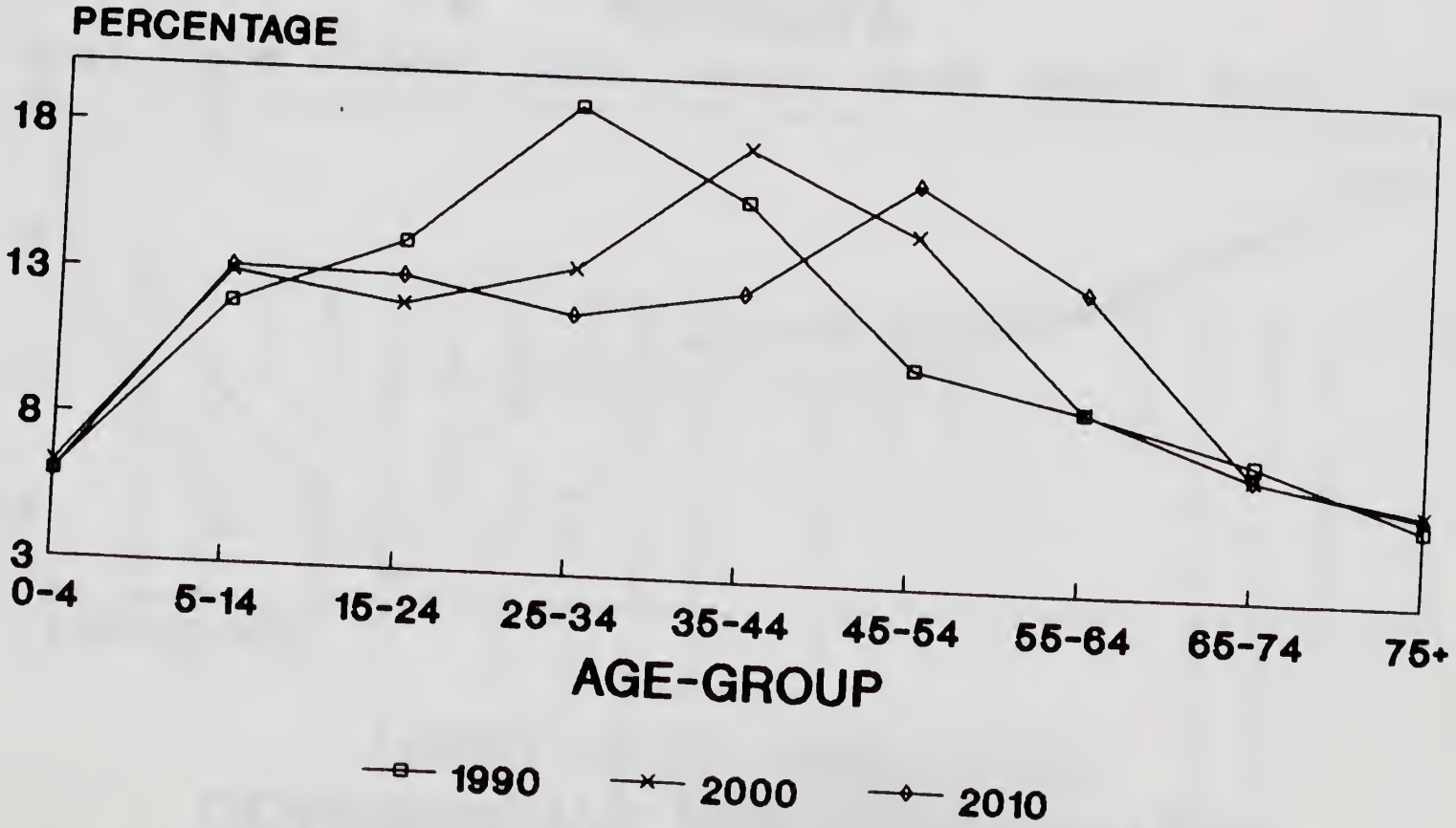
MAPC REGION
COMPARATIVE AGE DISTRIBUTION
(1960, 1970, AND 1980)



SOURCES: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

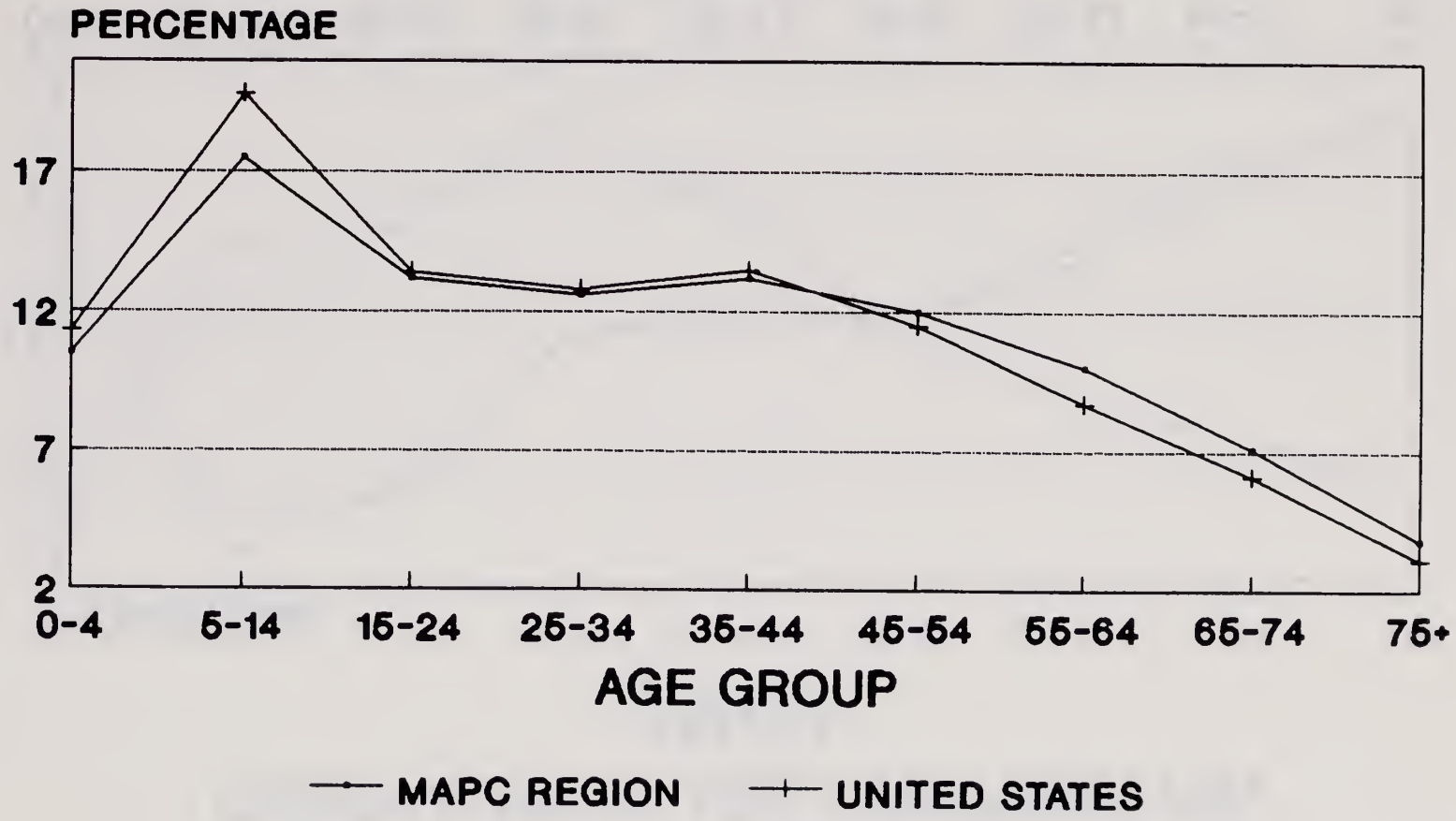
Graph 3

MAPC REGION
COMPARATIVE AGE DISTRIBUTION
(1990, 2000, AND 2010)



SOURCES: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

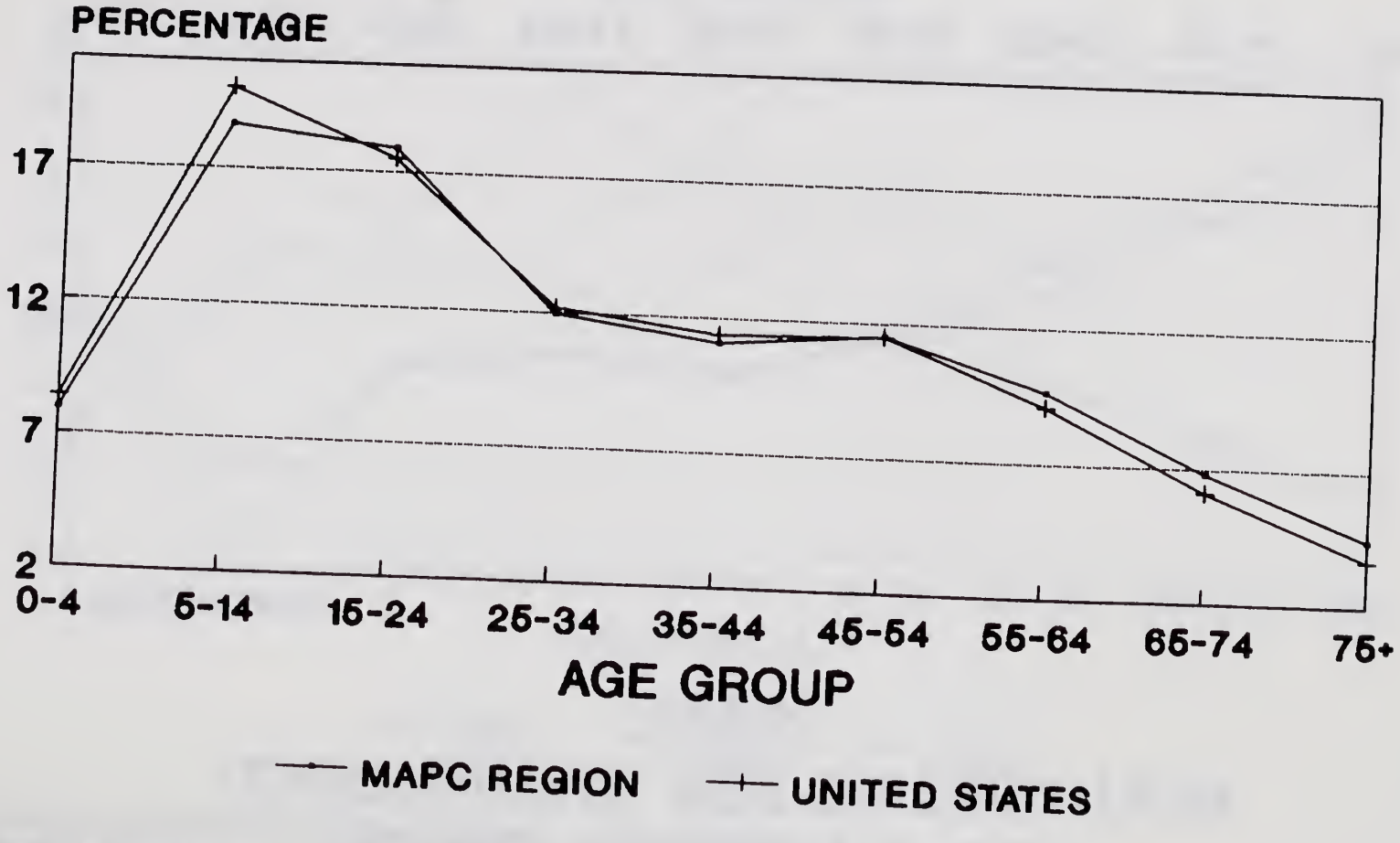
MAPC REGION & USA
COMPARATIVE AGE DISTRIBUTION
(1960)



SOURCE: BUREAU OF THE CENSUS.

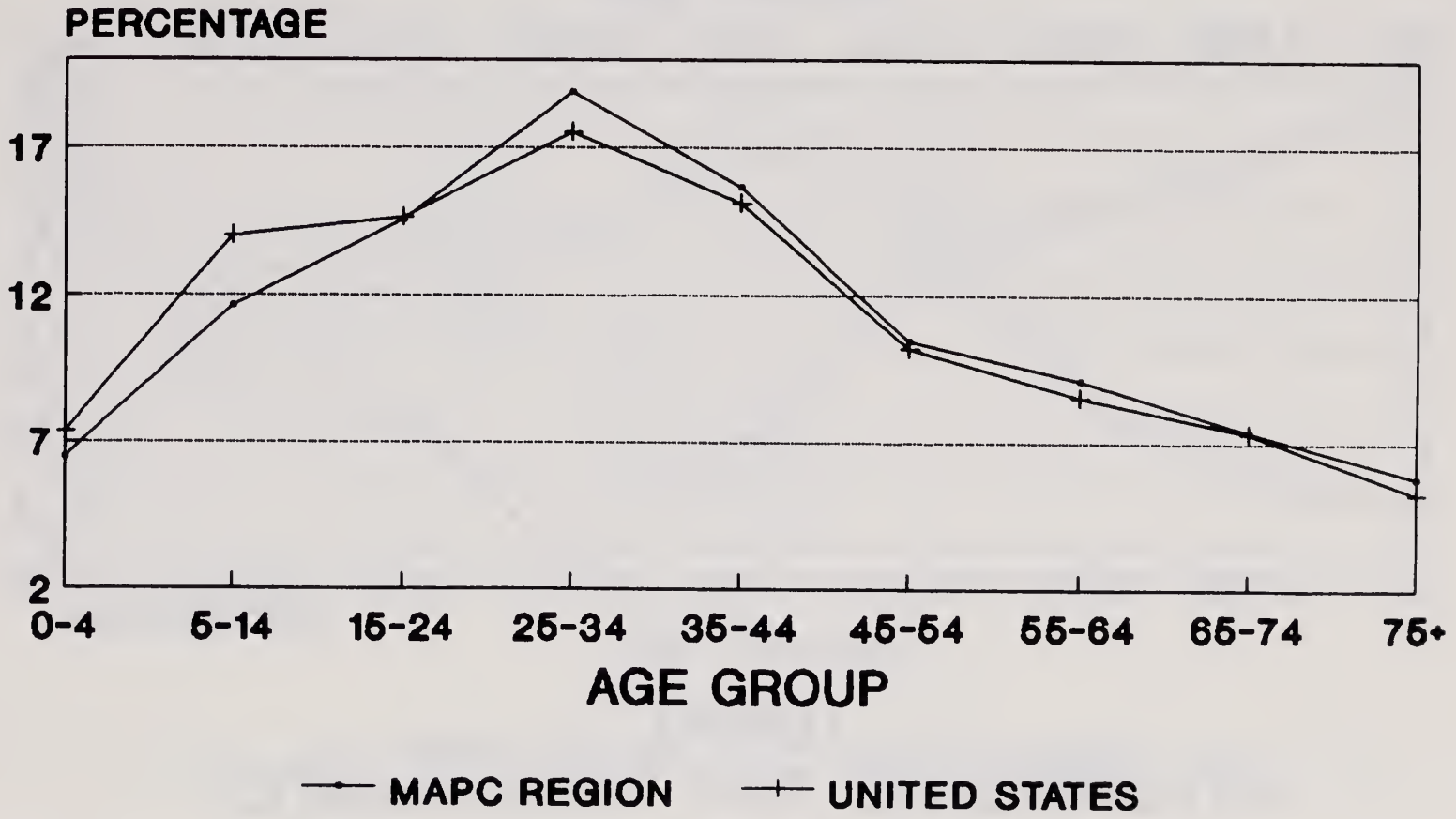
Graph 5

MAPC REGION & USA
COMPARATIVE AGE DISTRIBUTION
(1970)



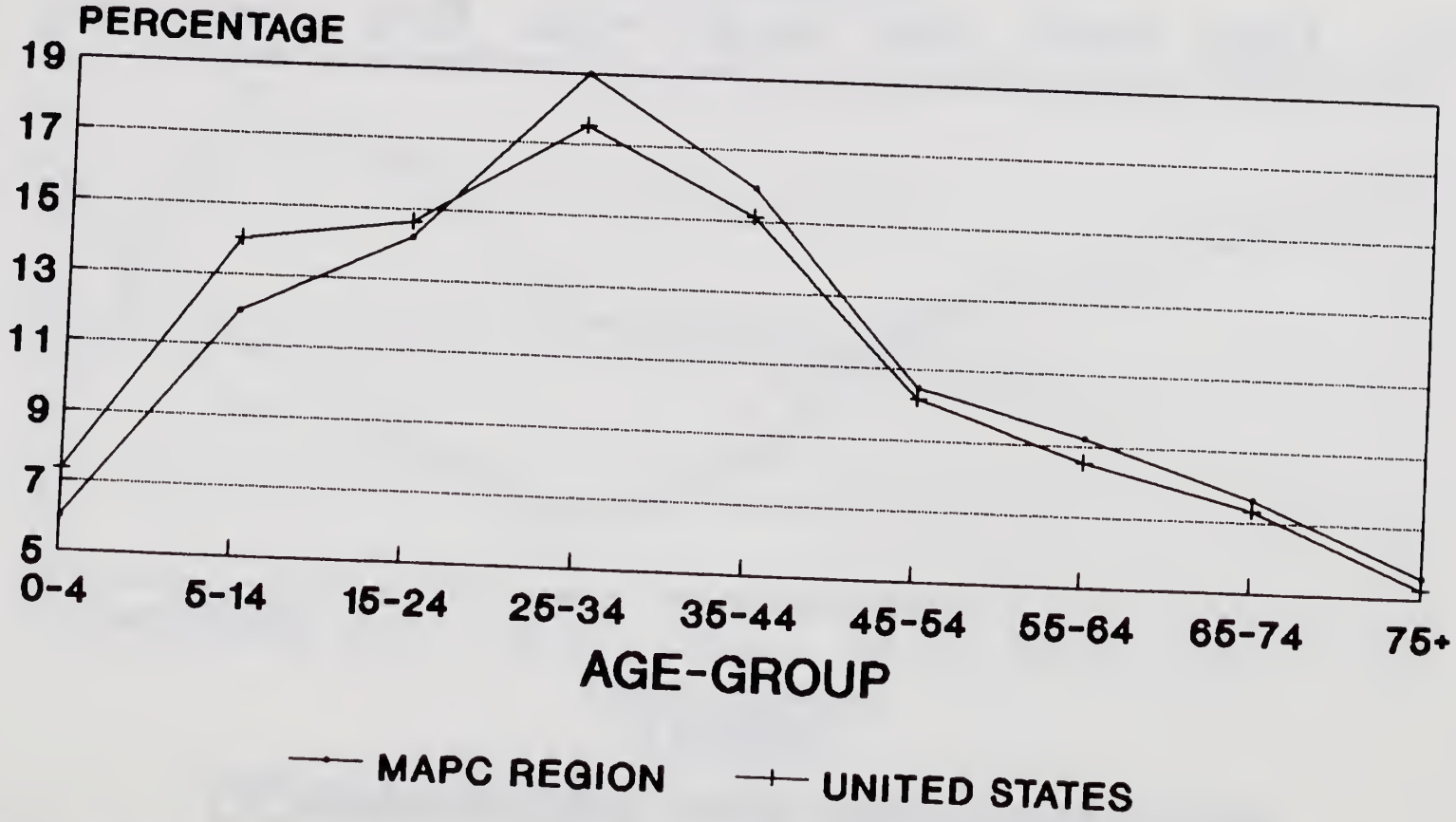
SOURCE: BUREAU OF THE CENSUS.

MAPC REGION & USA
COMPARATIVE AGE DISTRIBUTION
(1980)



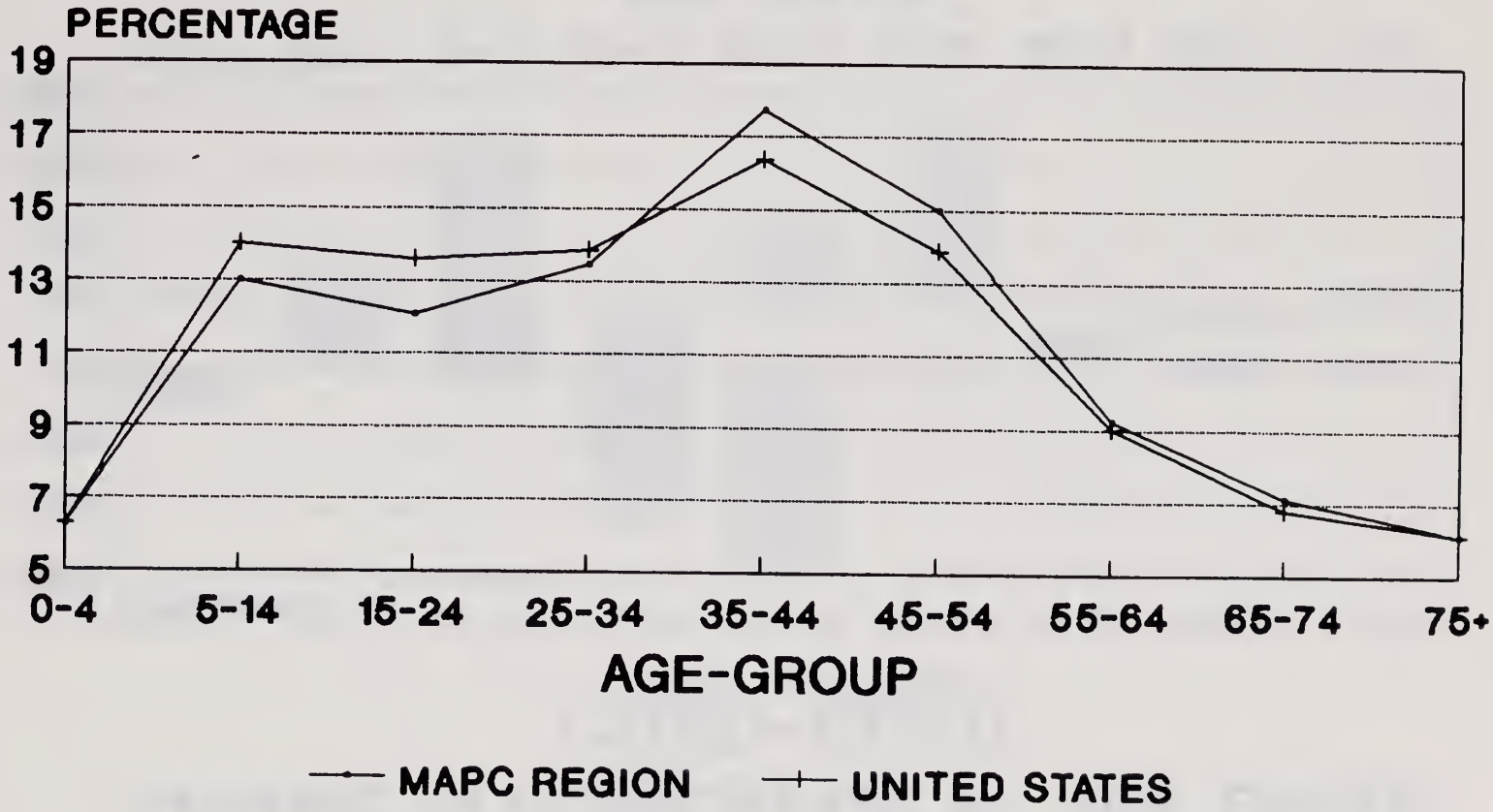
SOURCE: BUREAU OF THE CENSUS.

MAPC REGION & USA
COMPARATIVE AGE DISTRIBUTION
(1990)



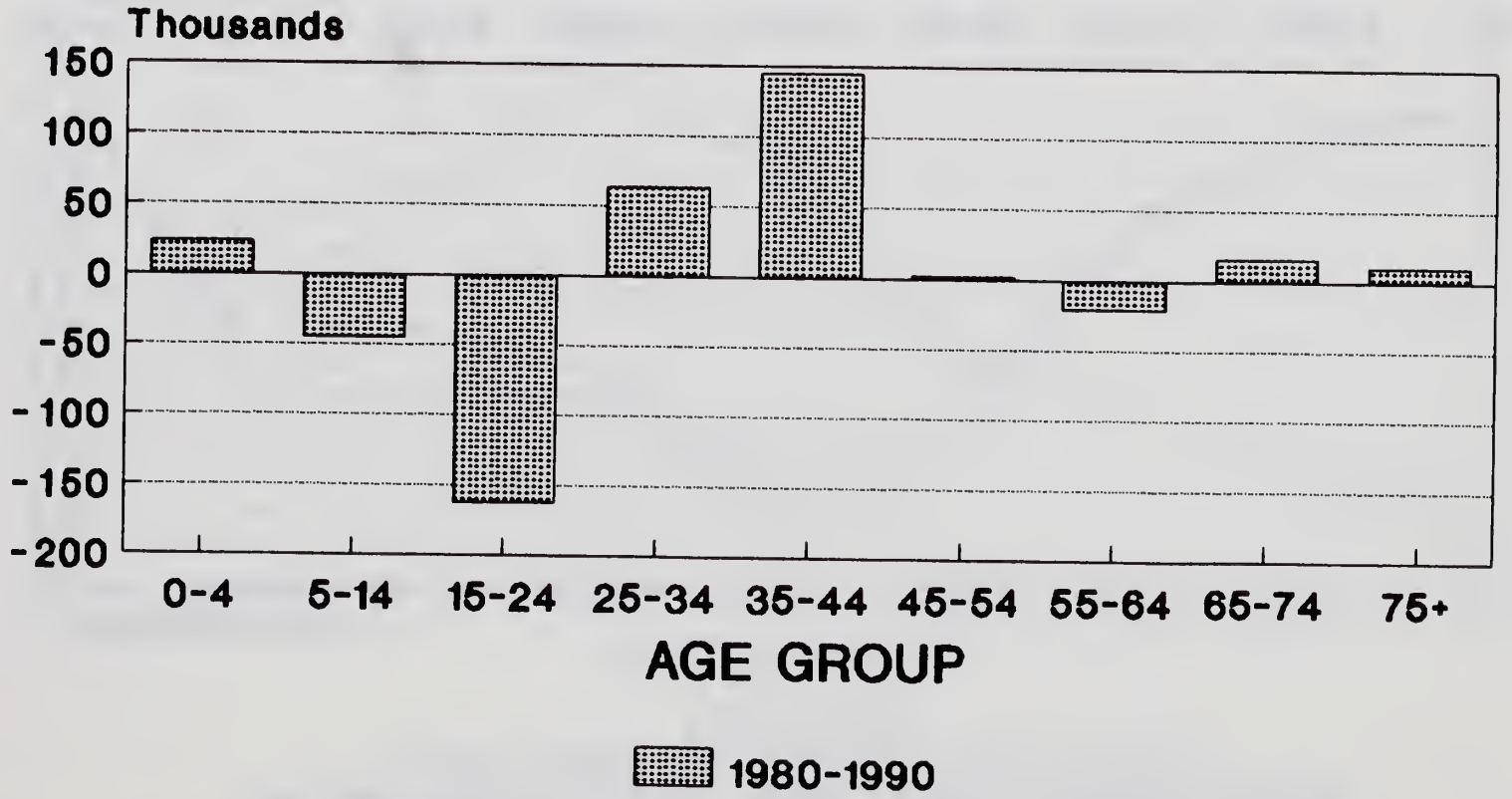
SOURCE: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

MAPC REGION & USA
COMPARATIVE AGE DISTRIBUTION
(2000)



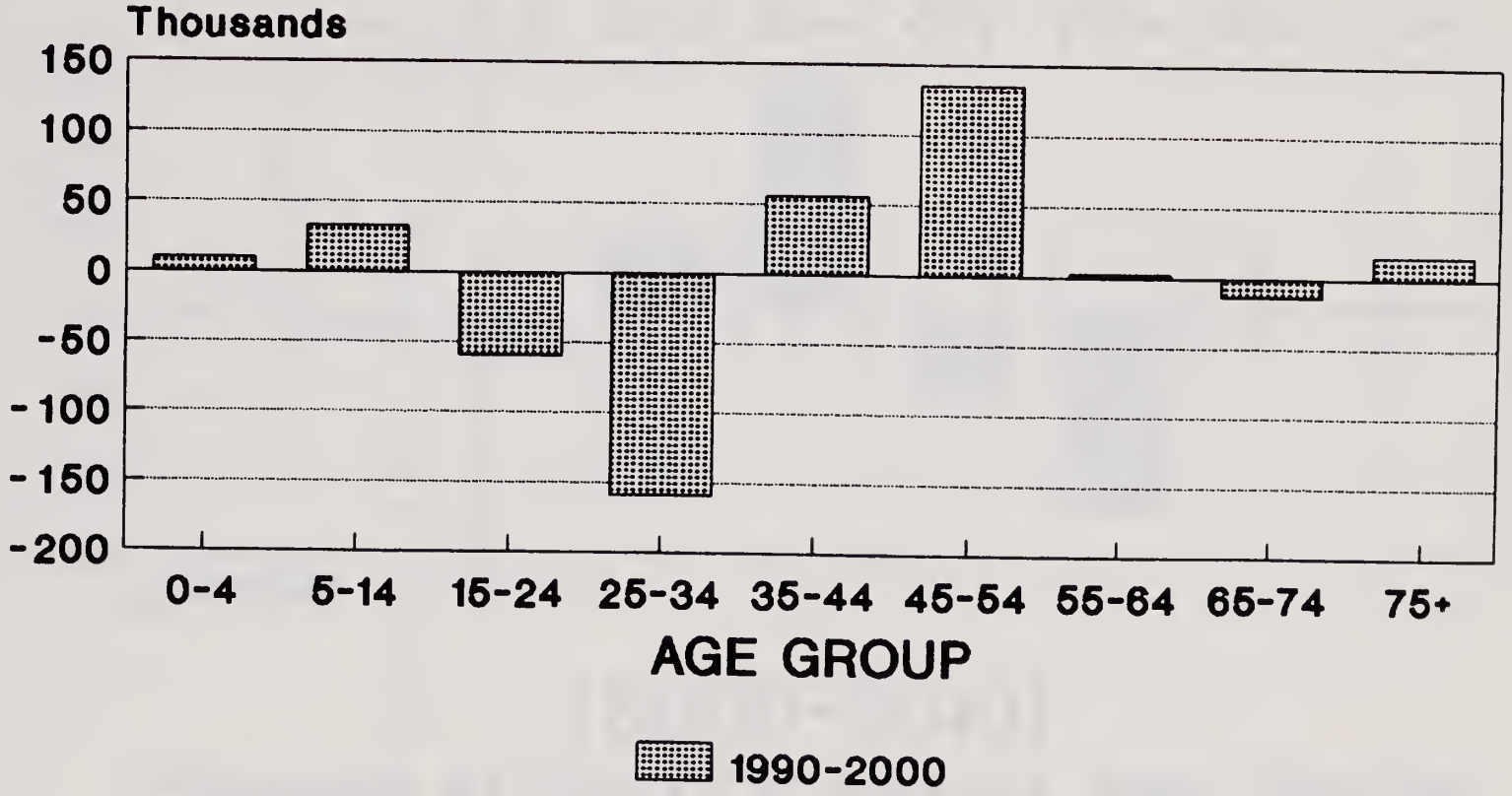
SOURCE: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

MAPC REGION
CHANGE IN POPULATION BY AGE GROUP
(1980-1990)



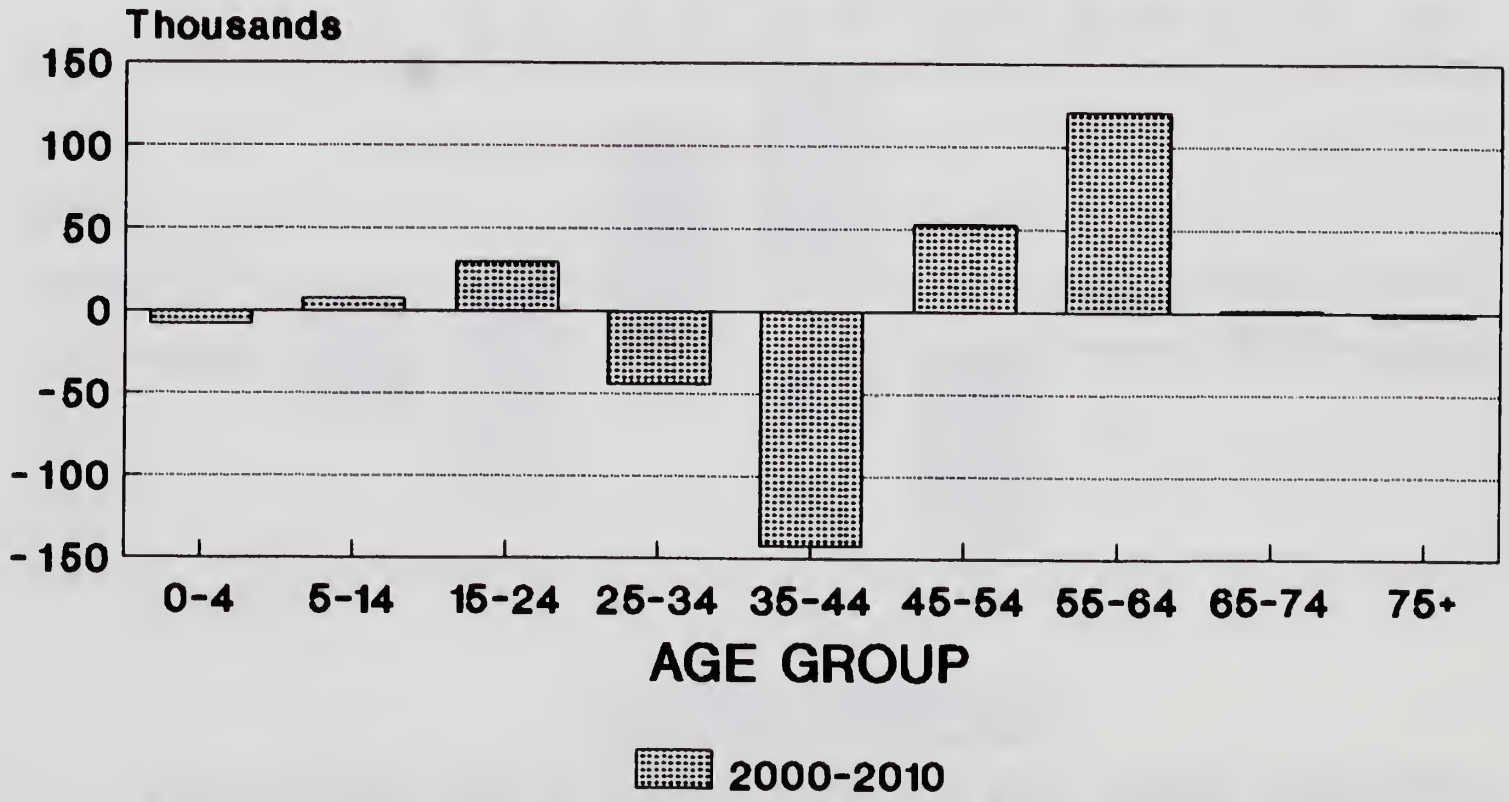
SOURCE: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

MAPC REGION
CHANGE IN POPULATION BY AGE GROUP
(1990-2000)



SOURCE: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

MAPC REGION
CHANGE IN POPULATION BY AGE GROUP
(2000-2010)



SOURCE: BUREAU OF THE CENSUS.
METROPOLITAN AREA PLANNING COUNCIL.

APPENDIX 1

MAPC REGION

POPULATION (1940-86)

YEAR	POPULATION
1940	2,342,247
1950	2,558,069
1960	2,777,784
1970	3,013,715
1980	2,884,712
1981	2,880,764
1982	2,876,815
1983	2,883,256
1984	2,889,697
1985	2,886,989
1986	2,882,990

SOURCES: BUREAU OF THE CENSUS, U.S. DEPARTMENT OF COMMERCE.

MASSACHUSETTS CENSUS OF POPULATION, OFFICE OF THE SECRETARY OF STATE.

METROPOLITAN AREA PLANNING COUNCIL.

APPENDIX 2

MAPC REGION

AGE STRUCTURE OF POPULATION (1960-1980)

AGE GROUP	PERCENTAGE OF TOTAL POPULATION		
	1960	1970	1980
0-4	10.5	7.9	5.2
5-14	17.6	18.6	13.6
15-24	13.2	17.9	20.0
25-34	12.6	12.0	17.0
35-44	13.2	11.1	11.1
45-54	12.0	11.5	10.5
55-64	10.0	9.7	10.0
65-74	7.1	6.8	7.2
75+	3.8	4.5	5.3

SOURCES: BUREAU OF THE CENSUS, U.S. DEPARTMENT OF COMMERCE.

METROPOLITAN AREA PLANNING COUNCIL.

APPENDIX 3

MAPC REGION

BIRTH, DEATH, AND NATURAL INCREASE RATES PER 1000 POPULATION

YEAR	BIRTHS	DEATHS	NATURAL INCREASE
1970	16.4	9.9	6.5
1971	14.6	9.8	4.8
1972	12.8	9.7	3.1
1973	11.8	9.7	2.1
1974	11.5	9.5	2.0
1975	11.2	9.2	2.0
1976	10.8	9.3	1.5
1977	11.1	8.9	2.2
1978	11.3	9.0	2.3
1979	11.6	8.9	2.7
1980	12.3	9.4	2.9
1981	12.1	9.1	3.0
1982	12.5	9.2	3.3
1983	12.5	9.1	3.4
1984	12.9	9.4	3.4
1985	13.5	9.5	4.1
1986	13.6	9.4	4.2

SOURCES: MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH.

U.S. DEPARTMENT OF HEALTH.

METROPOLITAN AREA PLANNING COUNCIL.

APPENDIX 4

MAPC REGION

AGE-SPECIFIC DEATH RATES* (1976-85)

AGE GROUP	DEATH RATE PER 100,000 PERSONS	
	AVERAGE 1976-79	AVERAGE 1980-85
0-4	187.71	244.32
5-9	18.66	18.33
10-14	21.57	18.94
15-19	79.26	61.06
20-29	114.99	85.28
30-39	145.72	126.02
40-44	208.81	237.00
45-49	356.47	370.89
50-54	648.47	569.51
55-59	1,065.14	931.93
60-64	1,683.78	1,521.08
65-69	2,631.80	2,367.08
70-74	3,653.82	3,551.66
75-79	5,864.10	3,206.87
80+	27,546.44	26,803.00

* The rates are crude, unadjusted for population size.

SOURCES: MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH.

U.S. DEPARTMENT OF HEALTH.

METROPOLITAN AREA PLANNING COUNCIL.

APPENDIX 5

MAPC REGION

COMMUNITY	POPULATION (1940-1960) 1940	1950	1960
ACTON	2,701	3,510	7,238
ARLINGTON	40,013	44,353	49,953
ASHLAND	2,479	3,500	7,779
BEDFORD	3,807	5,234	10,969
BELLINGHAM	2,979	4,100	6,774
BELMONT	26,867	27,381	28,715
BEVERLY	25,537	28,884	36,108
BOLTON	775	956	1,264
BOSTON	770,816	801,444	697,197
BOXBOROUGH	376	439	744
BRAINTREE	16,378	23,161	31,069
BROOKLINE	49,786	57,589	54,044
BURLINGTON	2,275	3,250	12,852
CAMBRIDGE	110,879	120,740	107,716
CANTON	6,381	7,465	12,771
CARLISLE	747	876	1,488
CHELSEA	41,259	38,912	33,749
COHASSET	3,111	3,731	5,840
CONCORD	7,972	8,623	12,517
DANVERS	14,179	15,720	21,926
DEDHAM	15,508	18,487	23,869
DOVER	1,374	1,722	2,846
DUXBURY	2,359	3,167	4,727
ESSEX	1,384	1,794	2,238
EVERETT	46,784	45,982	43,544
FOXBOROUGH	6,303	7,030	10,136
FRAMINGHAM	23,214	28,086	44,526
FRANKLIN	7,303	8,037	10,530
GLOUCESTER	24,046	25,167	25,789
HAMILTON	2,037	2,764	5,488
HANOVER	2,875	3,389	5,923
HINGHAM	8,003	10,665	15,378
HOLBROOK	3,330	4,004	10,104
HOLLISTON	3,000	3,753	6,222
HOPKINTON	2,697	3,486	4,932
HUDSON	8,042	8,211	9,666
HULL	2,167	3,379	7,055
IPSWICH	6,348	6,895	8,544
LEXINGTON	13,187	17,335	27,691
LINCOLN	1,783	2,427	5,613
LITTLETON	1,651	2,349	5,109
LYNN	98,123	99,738	94,478
LYNNFIELD	2,287	3,927	8,398
MALDEN	58,010	59,804	57,676
MANCHESTER	2,472	2,868	3,932
MARBLEHEAD	10,856	13,765	18,521
MARLBOROUGH	15,154	15,756	18,819
MARSHFIELD	2,419	3,267	6,748
MAYNARD	6,812	6,978	7,695
MEDFIELD	4,384	4,549	6,021

MEDFORD	63,083	66,113	64,971
MEDWAY	3,297	3,744	5,168
MELROSE	25,333	26,988	29,619
MIDDLETON	2,348	2,916	3,718
MILFORD	15,388	15,442	15,749
MILLIS	2,278	2,551	4,374
MILTON	18,708	22,395	26,375
NAHANT	1,835	2,679	3,960
NATICK	13,851	19,838	28,831
NEEDHAM	12,445	16,313	25,793
NEWTON	69,873	81,994	92,384
NORFOLK	2,294	2,704	3,471
NO. READING	2,886	4,402	8,331
NORWELL	1,871	2,515	5,207
NORWOOD	15,383	16,636	24,898
PEABODY	21,711	22,645	32,202
PEMBROKE	1,718	2,579	4,919
QUINCY	75,810	83,835	87,409
RANDOLPH	7,634	9,982	18,900
READING	10,866	14,006	19,259
REVERE	34,405	36,763	40,080
ROCKLAND	8,087	8,960	13,119
ROCKPORT	3,556	4,231	4,616
SALEM	41,213	41,880	39,211
SAUGUS	14,825	17,162	20,666
SCITUATE	4,130	5,993	11,214
SHARON	3,737	4,847	10,070
SHERBORN	1,022	1,245	1,806
SOMERVILLE	102,177	102,351	94,697
SOUTHBOROUGH	2,231	2,760	3,996
STONEHAM	10,765	13,229	17,821
STOUGHTON	8,632	11,146	16,328
STOW	1,243	1,700	2,573
SUDBURY	1,754	2,596	7,447
SWAMPSCOTT	10,761	11,580	13,294
TOPSFIELD	1,150	1,412	3,351
WAKEFIELD	16,223	19,633	24,295
WALPOLE	7,443	9,109	14,068
WALTHAM	40,020	47,187	55,413
WATERTOWN	35,427	37,329	39,092
WAYLAND	3,505	4,407	10,444
WELLESLEY	15,127	20,549	26,071
WENHAM	1,220	1,644	2,798
WESTON	3,590	5,026	8,261
WESTWOOD	3,376	5,837	10,354
WEYMOUTH	23,868	32,690	48,177
WILMINGTON	4,645	7,039	12,475
WINCHESTER	15,081	15,509	19,376
WINTHROP	16,768	19,496	20,303
WOBURN	19,751	20,492	31,214
WRENTHAM	4,674	5,341	6,685
TOTAL	2,342,247	2,558,069	2,777,784

SOURCE: BUREAU OF THE CENSUS,
U. S. DEPARTMENT OF COMMERCE.

APPENDIX 6

MAPC REGION

COMMUNITY	POPULATION (1970-1986) 1970	1980	1986
ACTON	14,770	17,544	17,350
ARLINGTON	53,524	48,219	44,350
ASHLAND	8,882	9,165	10,870
BEDFORD	13,513	13,067	12,490
BELLINGHAM	13,967	14,300	14,230
BELMONT	28,285	26,100	25,020
BEVERLY	38,348	37,655	36,980
BOLTON	1,905	2,530	2,940
BOSTON	641,071	562,994	573,600
BOXBOROUGH	1,451	3,126	3,060
BRAINTREE	35,050	36,337	34,690
BROOKLINE	58,689	55,062	52,360
BURLINGTON	21,980	23,486	22,750
CAMBRIDGE	100,361	95,322	91,260
CANTON	17,100	18,182	18,340
CARLISLE	2,871	3,306	4,060
CHELSEA	30,625	25,431	25,640
COHASSET	6,954	7,174	7,290
CONCORD	16,148	16,293	16,470
DANVERS	26,151	24,100	24,150
DEDHAM	26,938	25,298	23,810
DOVER	4,529	4,703	4,830
DUXBURY	7,636	11,807	13,820
ESSEX	2,670	2,998	2,960
EVERETT	42,485	37,195	36,330
FOXBOROUGH	14,218	14,148	14,550
FRAMINGHAM	64,048	65,113	63,890
FRANKLIN	17,830	18,217	19,620
GLOUCESTER	27,941	27,768	28,230
HAMILTON	6,373	6,960	7,140
HANOVER	10,107	11,358	11,560
HINGHAM	18,845	20,339	19,670
HOLBROOK	11,775	11,140	10,880
HOLLISTON	12,069	12,622	12,980
HOPKINTON	5,981	7,114	8,460
HUDSON	16,084	16,408	17,550
HULL	9,961	9,714	9,630
IPSWICH	10,750	11,158	11,750
LEXINGTON	31,886	29,479	28,610
LINCOLN	7,567	7,098	7,710
LITTLETON	6,380	6,970	7,170
LYNN	90,294	78,471	78,560
LYNNFIELD	10,826	11,267	11,350
MALDEN	56,127	53,386	53,490
MANCHESTER	5,151	5,424	5,260
MARBLEHEAD	21,295	20,126	19,580
MARLBOROUGH	27,936	30,617	31,180
MARSHFIELD	15,223	20,916	22,180
MAYNARD	9,710	9,590	9,900
MEDFIELD	9,821	10,220	10,610

MEDFORD	64,397	58,076	56,830
MEDWAY	7,938	8,447	9,360
MELROSE	33,180	30,055	28,790
MIDDLETON	4,044	4,135	4,710
MILFORD	19,352	23,390	24,230
MILLIS	5,686	6,908	7,250
MILTON	27,190	25,860	25,500
NAHANT	4,119	3,947	3,940
NATICK	31,057	29,461	30,270
NEEDHAM	29,748	27,901	27,240
NEWTON	91,263	83,622	82,140
NORFOLK	4,656	6,363	7,930
NO. READING	11,264	11,455	11,880
NORWELL	7,796	9,182	9,240
NORWOOD	30,815	29,711	28,220
PEABODY	48,080	45,976	46,300
PEMBROKE	11,193	13,487	14,540
QUINCY	87,966	84,743	82,630
RANDOLPH	27,035	28,218	28,580
READING	22,539	22,678	22,550
REVERE	43,159	42,423	43,510
ROCKLAND	15,674	15,695	15,340
ROCKPORT	5,636	6,345	6,690
SALEM	40,556	38,220	38,050
SAUGUS	25,110	24,746	25,860
SCITUATE	16,973	17,317	16,960
SHARON	12,367	13,601	14,660
SHERBORN	3,309	4,049	4,260
SOMERVILLE	88,779	77,372	72,280
SOUTHBOROUGH	5,798	6,193	6,420
STONEHAM	20,725	21,424	22,550
STOUGHTON	23,459	26,710	27,190
STOW	3,984	5,144	5,470
SUDBURY	13,506	14,027	14,140
SWAMPSCOTT	13,578	13,837	13,330
TOPSFIELD	5,225	5,709	5,550
WAKEFIELD	25,402	24,895	25,170
WALPOLE	18,149	18,859	19,720
WALTHAM	61,582	58,200	57,090
WATERTOWN	39,307	34,384	32,890
WAYLAND	13,461	12,170	12,190
WELLESLEY	28,051	27,209	26,550
WENHAM	3,849	3,897	3,810
WESTON	10,870	11,169	10,700
WESTWOOD	12,750	13,212	12,580
WEYMOUTH	54,610	55,601	54,480
WILMINGTON	17,102	17,471	17,530
WINCHESTER	22,269	20,701	20,120
WINTHROP	20,335	19,294	18,640
WOBURN	37,406	36,626	37,380
WRENTHAM	7,315	7,580	8,590
TOTAL	3,013,715	2,884,712	2,882,990

SOURCES: BUREAU OF THE CENSUS,
U. S. DEPARTMENT OF COMMERCE.

MASSACHUSETTS CENSUS OF POPULATION,
OFFICE OF THE SECRETARY OF STATE.

APPENDIX 7

MAPC REGION

COMMUNITY	NATURAL INCREASE IN POPULATION (1940-1986) 1940-50	1950-60	1960-70	1970-80	1980-86
ACTON	275	937	1673	1792	649
ARLINGTON	2906	5142	3823	91	-219
ASHLAND	271	1435	1403	662	717
BEDFORD	170	1999	2358	974	560
BELLINGHAM	333	991	2067	1617	828
BELMONT	1900	1852	1160	-467	-316
BEVERLY	2305	4381	3689	1122	951
BOLTON	89	173	199	194	147
BOSTON	52100	69503	45736	12630	16894
BOXBOROUGH	19	104	144	346	259
BRAINTREE	2291	3575	2840	135	-14
BROOKLINE	1069	1358	-1539	-2616	-235
BURLINGTON	295	1763	4082	1989	838
CAMBRIDGE	11556	12690	7296	1495	1667
CANTON	606	1561	2194	772	222
CARLISLE	67	193	275	160	176
CHELSEA	3473	3111	1611	302	642
COHASSET	306	497	490	19	58
CONCORD	566	1499	1167	134	50
DANVERS	1024	2257	2651	437	204
DEDHAM	1514	2642	2508	375	163
DOVER	157	268	291	37	69
DUXBURY	112	389	296	484	480
ESSEX	88	364	113	119	99
EVERETT	5425	5972	4605	1029	544
FOXBOROUGH	394	1167	1902	1096	558
FRAMINGHAM	2168	6010	8253	3938	1237
FRANKLIN	561	946	2506	1525	1035
GLOUCESTER	1572	2309	1643	487	831
HAMILTON	240	757	575	280	317
HANOVER	202	626	1199	965	490
HINGHAM	1077	2033	1588	626	381
HOLBROOK	288	1396	1685	629	275
HOLLISTON	260	838	1786	1482	720
HOPKINTON	252	699	714	418	494
HUDSON	520	1009	1946	1257	819
HULL	265	818	955	542	365
IPSWICH	545	1040	507	382	290
LEXINGTON	1129	2970	2398	112	17
LINCOLN	194	452	330	33	65
LITTLETON	154	770	989	479	225
LYNN	6596	8871	5359	1319	2142
LYNNFIELD	291	763	627	131	141
MALDEN	4841	6076	4247	862	801
MANCHESTER	83	370	407	75	36
MARBLEHEAD	888	1671	1514	-240	137
MARLBOROUGH	807	1865	3501	2505	1145
MARSHFIELD	114	557	1338	1757	1165
MAYNARD	402	608	889	402	336
MEDFIELD	171	590	853	471	438

MEDFORD	6348	7268	4581	422	357
MEDWAY	164	614	1126	634	433
MELROSE	1466	2151	2049	731	315
MIDDLETON	128	394	332	182	175
MILFORD	1224	1812	1539	1837	853
MILLIS	238	601	841	604	465
MILTON	912	745	-248	-869	-103
NAHANT	266	452	355	3	-5
NATICK	1720	4909	3405	1034	814
NEEDHAM	1214	2736	2154	480	284
NEWTON	5547	7718	3563	-412	700
NORFOLK	129	340	544	431	467
NO. READING	345	1291	1443	953	496
NORWELL	129	715	967	581	233
NORWOOD	1420	3807	3766	685	249
PEABODY	1612	3600	5017	2071	958
PEMBROKE	114	414	1336	1277	847
QUINCY	9289	11209	9063	604	170
RANDOLPH	823	2825	3209	853	398
READING	1040	2047	1964	840	664
REVERE	3536	4624	3241	481	344
ROCKLAND	513	1423	1991	1141	877
ROCKPORT	55	44	11	-301	-45
SALEM	2684	3299	2074	493	545
SAUGUS	1592	2139	2140	541	409
SCITUATE	360	1246	1651	505	362
SHARON	342	1255	1130	562	646
SHERBORN	124	183	226	178	173
SOMERVILLE	9650	12417	10186	2008	1071
SOUTHBOROUGH	173	439	617	309	251
STONEHAM	1111	2192	1897	560	455
STOUGHTON	877	2456	2805	1568	596
STOW	61	311	402	345	290
SUDBURY	187	781	1664	842	474
SWAMPSCOTT	627	800	248	-307	-97
TOPSFIELD	90	397	455	253	147
WAKEFIELD	1786	2994	2081	656	532
WALPOLE	1030	1881	2289	932	567
WALTHAM	4664	7931	7296	2205	857
WATERTOWN	3478	5291	4883	982	179
WAYLAND	417	1386	1361	520	297
WELLESLEY	1388	1942	1002	78	297
WENHAM	75	278	190	10	51
WESTON	336	37	430	-5	9
WESTWOOD	730	1282	1124	181	205
WEYMOUTH	3446	7355	6012	2385	1049
WILMINGTON	611	1888	2367	1287	715
WINCHESTER	1166	1464	1403	422	206
WINTHROP	1449	2128	1428	-263	-256
WOBURN	1831	5244	5642	2140	1393
WRENTHAM	194	374	447	225	315
TOTAL	191642	300996	254542	79239	61577

SOURCE: VITAL STATISTICS OF MASSACHUSETTS,
MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH.

APPENDIX 8

MAPC REGION

NET MIGRATION (1940-1986)

COMMUNITY	1940-50	1950-60	1960-70	1970-80	1980-86
ACTON	534	2791	5859	982	-843
ARLINGTON	1434	458	-252	-5396	-3650
ASHLAND	750	2844	-300	-379	988
BEDFORD	1257	3736	186	-1420	-1137
BELLINGHAM	788	1683	5126	-1284	-898
BELMONT	-1386	-518	-1590	-1718	-764
BEVERLY	1042	2843	-1449	-1815	-1626
BOLTON	92	135	442	431	263
BOSTON	-21472	-173750	-101862	-90707	-6288
BOXBOROUGH	44	201	563	1329	-325
BRAINTREE	4492	4333	1141	1152	-1633
BROOKLINE	6734	-4903	6184	-1011	-2467
BURLINGTON	680	7839	5046	-483	-1574
CAMBRIDGE	-1695	-25714	-14651	-6534	-5729
CANTON	478	3745	2135	310	-64
CARLISLE	62	419	1108	275	578
CHELSEA	-5820	-8274	-4735	-5496	-433
COHASSET	314	1612	624	201	58
CONCORD	85	2395	2464	11	127
DANVERS	517	3949	1574	-2488	-154
DEDHAM	1465	2740	561	-2015	-1651
DOVER	191	856	1392	137	58
DUXBURY	696	1171	2613	3687	1533
ESSEX	322	80	319	209	-137
EVERETT	-6227	-8410	-5664	-6319	-1409
FOXBOROUGH	333	1939	2180	-1166	-156
FRAMINGHAM	2704	10430	11269	-2873	-2460
FRANKLIN	173	1547	4794	-1138	368
GLOUCESTER	-451	-1687	509	-660	-369
HAMILTON	487	1967	310	307	-137
HANOVER	312	1908	2985	286	-288
HINGHAM	1585	2680	1879	868	-1050
HOLBROOK	386	4704	-14	-1264	-535
HOLLISTON	493	1631	4061	-929	-362
HOPKINTON	537	747	335	715	852
HUDSON	-351	446	4472	-933	323
HULL	947	2858	1951	-789	-449
IPSWICH	2	609	1699	26	302
LEXINGTON	3019	7386	1797	-2519	-886
LINCOLN	450	2734	1624	-502	547
LITTLETON	544	1990	282	111	-25
LYNN	-4981	-14131	-9543	-13142	-2053
LYNNFIELD	1349	3708	1801	310	-58
MALDEN	-3047	-8204	-5796	-3603	-697
MANCHESTER	313	694	812	198	-200
MARBLEHEAD	2021	3085	1260	-929	-683
MARLBOROUGH	-205	1198	5616	176	-582
MARSHFIELD	734	2924	7137	3936	99
MAYNARD	-236	109	1126	-522	-26
MEDFIELD	-6	882	2947	-72	-48

MEDFORD	-3318	-8410	-5155	-6743	-1603
MEDWAY	283	810	1644	-125	480
MELROSE	189	480	1512	-3856	-1580
MIDDLETON	440	408	-6	-91	400
MILFORD	-1170	-1505	2064	2201	-13
MILLIS	35	1222	471	618	-123
MILTON	2775	3235	1063	-461	-257
NAHANT	578	829	-196	-175	-2
NATICK	4267	4084	-1179	-2630	-5
NEEDHAM	2654	6744	1801	-2327	-945
NEWTON	6574	2672	-4684	-7229	-2182
NORFOLK	281	427	641	1276	1100
NO. READING	1171	2638	1490	-762	-71
NORWELL	515	1977	1622	805	-175
NORWOOD	-167	4455	2151	-1789	-1740
PEABODY	-678	5957	10861	-4175	-634
PEMBROKE	747	1926	4938	1017	206
QUINCY	-1264	-7635	-8506	-3827	-2283
RANDOLPH	1525	6093	4926	330	-36
READING	2100	3206	1316	-701	-792
REVERE	-1178	-1307	-162	-1217	743
ROCKLAND	360	2736	564	-1120	-1232
ROCKPORT	620	341	1009	1010	390
SALEM	-2017	-5968	-729	-2829	-715
SAUGUS	745	1365	2304	-905	705
SCITUATE	1503	3975	4108	-161	-719
SHARON	768	3968	1167	672	413
SHERBORN	99	378	1277	562	38
SOMERVILLE	-9476	-20071	-16104	-13415	-6163
SOUTHBOROUGH	356	797	1185	86	-24
STONEHAM	1353	2400	1007	139	671
STOUGHTON	1637	2726	4326	1683	-116
STOW	396	562	1009	815	36
SUDBURY	655	4070	4395	-321	-361
SWAMPSCOTT	192	914	36	566	-410
TOPSFIELD	172	1542	1419	231	-306
WAKEFIELD	1624	1668	-974	-1163	-257
WALPOLE	636	3078	1792	-222	294
WALTHAM	2503	295	-1127	-5587	-1967
WATERTOWN	-1576	-3528	-4668	-5905	-1673
WAYLAND	485	4651	1656	-1811	-277
WELLESLEY	4034	3580	978	-920	-956
WENHAM	349	876	861	38	-138
WESTON	1100	3198	2179	304	-478
WESTWOOD	1731	3235	1272	281	-837
WEYMOUTH	5376	8132	421	-1394	-2170
WILMINGTON	1783	3548	2260	-918	-656
WINCHESTER	-738	2403	1490	-1990	-787
WINTHROP	1279	-1321	-1396	-778	-398
WOBURN	-1090	5478	550	-2920	-639
WRENTHAM	473	970	183	40	695
TOTAL	24180	-81281	-18611	-208242	-63299

SOURCES: BUREAU OF THE CENSUS,
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MASSACHUSETTS CENSUS OF POPULATION,
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